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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------------------------|------------------------|
| 10/603,990 | 06/26/2003 | Mi-Sook Nam | 053785-5120 | 3882 |
| 9629 7590 01/20/2010 MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004 | | | EXAMINER SCHECHTER, ANDREW M | |
| | | | ART UNIT 2883 | PAPER NUMBER |
| | | | MAIL DATE 01/20/2010 | DELIVERY MODE PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/603,990

Applicant(s)

NAM ET AL.

Examiner

ANDREW SCHECHTER

Art Unit

2883

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 8-15 and 17-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-15 and 17-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6 November 2009 and 2 July 2009 have been fully considered but they are not persuasive. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

2. Claims 1, 10, 12, 19, and 21 are objected to because of the following informalities: the amended "drain electrodes" should be "drain electrode". Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-5, 8-15, and 17-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites a "pixel region" whose spatial extent is unclear, as well as a "drain electrode" whose spatial extent is unclear. This is critical to the claim, since an alleged point of novelty appears to rest on the limitation requiring "the drain electrode not overlapping the pixel region", as well as "the reflective layer... not covering a region

covered by ... the drain electrode". The applicant's disclosure indicates where the pixel region and drain electrode in its own device are located, but appears to give no guidance for determining their extent in prior art references (or future devices).

The claim recites "a data line crossing the gate line and defining a pixel region", but as can be seen from the applicant's Figs. 6 and 7, the data line and gate line do not "define" the recited pixel region: the pixel region indicated by the dashed line and "P" label in Fig. 6 excludes certain areas near the TFT, critically the area at the contact hole [h1, h3], where the drain electrode overlaps the pixel electrode. If the data line crossing the gate line is supposed to define a pixel region, why is this area not part of the "pixel region"? Does the applicant intend for the data wiring (including the data line, source electrode, and drain electrode) and the gate wiring (including the gate line and gate electrode) to define the "pixel region"? Or does the applicant intend the "pixel region" to be defined by the extent of the reflective layer and its transmissive hole? Unless there is a clear definition of the "pixel region", the scope of the claim is unclear since it cannot be determined if the drain electrode of a prior art reference overlaps that region.

The claim recites "the drain electrode", and as discussed in the previous office actions, the spatial extent of this electrode is unclear. The examiner suggests that it could be recited either as the electrode attached to the drain region of the TFT, or it could be taken to be the portion of that electrode near to the channel of the TFT. Since these definitions correspond to different spatial extents in various prior art devices, it is necessary to have a clear definition so that it can be determined whether the drain electrode overlaps the pixel region as recited.

The examiner notes that the critical difference between the *Mitsui* structure as applied previously and the structure of the applicant's disclosed invention seems to be that the reflective layer does not overlap any of the electrode attached to the drain region of the TFT. This has been discussed previously (in the office action of 2 April 2009 and in the course of two interviews, 15 July 2009 and 29 October 2009), but no such limitation has been recited in the claims and no agreement has been reached on a definition of the spatial extent of the recited "drain electrode". The amendment of 6 November 2009 reciting "the drain electrode not overlapping the pixel region", does nothing to clarify how the "drain electrode" and its extent is to be determined for a given prior art structure, and there is no discussion from the applicant addressing this point. For examining purposes, the broadest reasonable interpretation of the claim language is therefore adopted: that the drain electrode is the portion of the electrode touching the drain region of the TFT which is adjacent to the channel region of the TFT, and does not include the entire electrode touching the drain region of the TFT. The previous rejections are therefore maintained, modified as necessary by the amendments to the claims.

To make the discussion more concrete, the examiner makes of record US 2001/0019373 to *Kobayashi et al.*, and respectfully requests that the applicant indicate the exact extent of the pixel region and drain electrode in Fig. 7 of that prior art device. Does the recited "drain electrode" include the part labeled "12", the vertical line segment, only the rectangular region labeled "11" at the bottom of the figure, or only the region next to the TFT, not overlapping the pixel electrode? Does the recited "pixel

region" include the entire region not covered by the data and gate lines, or the entire region not covered by the data wiring (which includes 11 and 12) and the gate wiring, or the entire region having a pixel electrode? The examiner notes that these questions should be answered for the embodiment in which the pixel electrode is reflective [see paragraph 0189, for instance], and should explain the reasoning behind each answer, of course.

Claims 10, 12, 19, and 21 have analogous problems, and the remaining claims depend from these.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 10, 12, 13, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kubota, et al.*, US 2002/0171792 in view of *Mitsui et al.*, U.S. Patent No. 5,408,345, in view of *Maeda et al.*, U.S. Patent No. 7,123,325 and further in view of official notice/admitted prior art.

Kubota discloses [see Fig. 1, for instance] a transmissive liquid crystal display device comprising a substrate [2] having a reflective portion and a transmissive portion, a gate line [14a] on the substrate, a data line [17], a thin film transistor [14] connected to the gate line and the data line, and including a gate electrode [14a], an active layer [12],

and source and drain electrodes [14b, 14c]; an insulating layer [19] having an open portion at the transmissive portion, a reflective layer [20] on the insulating layer having a transmissive hole at the open portion, a pixel electrode [3] on the reflective layer, an opposing substrate [5] facing the substrate, and a common electrode [6] on an inner surface of the opposing substrate, the common electrode being substantially flat.

Kubota possibly does not explicitly disclose that the gate and data lines cross to form a pixel region; the examiner takes official notice that this was well-known in the art at the time of the invention [as this was not traversed by the applicant, this is considered admitted prior art; see MPEP 2144.03]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have it so, motivated by the desire to form the standard active matrix of pixels for the display.

Kubota does not disclose the reflective layer disposed on the pixel region and not overlapping a region covered by the active layer, the gate electrode, the source electrode and the drain electrode, with the drain electrode not overlapping the pixel region. However, *Mitsui* discloses [see Fig. 5] an analogous device having the analogous reflective layer [38] disposed on the pixel region and not overlapping a region covered by the active layer, the gate electrode, the source electrode, and the drain electrode [see the above discussion under 35 USC 112, 2nd paragraph for how this term is understood], and teaches doing so [col. 3, lines 32-45], saying that when the reflective layer does overlap the TFT, the signal applied to the reflective layer can spuriously act as a gate electrode, causing the TFT to malfunction, and can produce an undesirable parasitic capacitance between the reflective layer and the gate electrode. It

would have been obvious to one of ordinary skill in the art at the time of the invention to have the reflective layer not overlapping the TFT and its component parts, motivated by the desire to avoid such electrical problems as taught by *Mitsui*. The pixel region defined by the crossing of the data line and gate line would have its extent marked by the extent of the reflective electrode, so the drain electrode [as defined above] would not overlap the pixel region.

Kubota does not disclose that the insulating layer [19] has a plurality of uneven patterns consisting of a first organic material layer within the reflective portion, the uneven patterns partially covering the substrate, and a second organic material layer on the first organic material layer. *Maeda* [see Fig. 10K, for instance] discloses an analogous transfective LCD in which the insulating layer under the reflective layer and pixel electrode has a plurality of uneven patterns consisting of a first organic material layer [51] within the reflective portion, the uneven patterns partially covering the substrate, and a second organic material layer [52] on the first organic material layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to have it be so, motivated by the desire to make the surface of the reflective layer bumpy, so that the light diffusively reflects off the surface (rather than reflecting like a mirror), thus improving the display quality. Claim 1 is therefore unpatentable.

Considering the additional limitations of claim 10, *Kubota* also discloses a liquid crystal layer between the pixel electrode, wherein the pixel electrode and the common electrode are separated by a first cell gap in the transmissive portion, and a second cell

gap in the reflective portion, and the first cell gap is twice greater than the second cell gap [see paragraph 0084, for instance]. Claim 10 is therefore unpatentable as well.

Considering the additional limitations of claims 12 and 19, *Kubota* in view of *Maeda* also discloses the method of fabricating the above LCD, except perhaps for the step of performing an exposure and development process on the first and second photosensitive organic material layers. *Maeda* discloses using organic layers which are photosensitive, but does not necessarily disclose the particular patterning steps recited. The examiner takes official notice that for patterning such organic layers, performing an exposure and development process on organic layers was well known [as this was not traversed by the applicant, this is considered admitted prior art; see MPEP 2144.03]. It would have been obvious to one of ordinary skill in the art at the time of the invention to do so, motivated by this being the standard technique for patterning organic materials in the art. Claims 12 and 19 are therefore unpatentable as well.

The first and second organic material layers are formed from a photosensitive material, including comprising a photo-acrylic resin [see *Maeda*, col. 13, lines 29-35, for instance], so claims 2 and 3 are also unpatentable. Considering claim 13, it would have been "obvious to try" a photo-acrylic resin for both the first and second photosensitive material layers, with predictable results, as this type of material is routinely used in forming such organic layers, as evidenced by *Maeda* above, so claim 13 is also unpatentable.

7. Claims 4, 5, 14, 15, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kubota, et al.*, US 2002/0171792, *Mitsui et al.*, U.S. Patent No.

5,408,345, *Maeda et al.*, U.S. Patent No. 7,123,325, and official notice/admitted prior art as applied above, and further in view of *You*, U.S. Patent No. 7,023,508.

Kubota discloses an insulating layer [18] covering the gate line, the data line, and the thin film transistor, but does not state that it is inorganic. *You* discloses an analogous device [see Fig. 3, for instance], which has an inorganic material layer [116] made of silicon nitride, covering the gate line, the data line, and the thin film transistor. It would have been obvious to one of ordinary skill in the art at the time of the invention to use an inorganic layer, such as *You's* silicon nitride, in the above device, motivated by *You's* teaching that this maintains the reliability of the transistor and pads and enhances the strength of COG bonding [col. 9, lines 1-8]. Claims 4, 5, 14, 15, and 21 are therefore unpatentable.

8. Claims 8, 9, 11, 17, 18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kubota, et al.*, US 2002/0171792, *Mitsui et al.*, U.S. Patent No. 5,408,345, *Maeda et al.*, U.S. Patent No. 7,123,325, and official notice/admitted prior art as applied above, in view of official notice.

Kubota does not necessarily disclose gate pads, data pads, or a capacitor electrode overlapping the gate line. The examiner takes official notice that these features are well-known and conventional in the art [as this was not traversed by the applicant, this is considered admitted prior art; see MPEP 2144.03]. It would have been obvious to one of ordinary skill in the art at the time of the invention to include them in the above device, motivated by the desire to make electrical contact to the gate and

data lines, and to provide a reliable storage capacitance to improve the display quality.

Claims 8 and 17 are therefore unpatentable.

Similarly, to make electrical contact to these, it is necessary to have drain contact holes, capacitor contact holes, gate pad contact holes, and data pad contact holes as recited; the examiner takes official notice that such are well-known [as this was not traversed by the applicant, this is considered admitted prior art; see MPEP 2144.03] and would have been obvious to one of ordinary skill in the art at the time of the invention, for the purpose of making electrical contact to the relevant electrodes through the second organic material layer. Claims 9 and 18 are therefore unpatentable.

The difference in cell gaps is provided by the height of the insulating film, and for the first (transmissive) cell gap to be twice the second (reflective) cell gap, the height needs to be equal to the second cell gap. The uneven patterns are equal to or less than this height, so they have a height equal to or less than the second cell gap, as required by claims 11 and 20. Claims 11 and 20 are therefore unpatentable. Even were this not true, adjusting the height of the uneven patterns to improve the reflective properties of the reflective layer, or to optimize the relative cell gaps for better liquid crystal behavior, would have been obvious to one of ordinary skill in the art at the time of the invention, motivated by the desire to optimize these features of the device, so claims 11 and 20 are unpatentable.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew Schechter/
Primary Examiner, Art Unit 2883
Technology Center 2800
18 January 2010